21971

S/020/61/137/005/014/026 B104/B214

The influence of elastic-relaxation ...

ASSOCIATION:

Gosudarstvennyy nauchno-issledovatel'skiy institut elektrotekhnicheskogo stekla i tekhnologicheskogo oborudovaniya (State Scientific Research Institute of Electrotechnical Glass and Technological Equipment)

PRESENTED:

December 9, 1960, by M. A. Leontovich, Academician

SUBMITTED:

December 2, 1960

card 5/5

75

841

L 2322-66 EWT(d)/FSS-2/EWT(l)/FS(v)-3/EEC(k)-2/FCC/EWA(h) TT/AST/GS/GW ACCESSION NR: AT5023616 UR/0000/65/000/000/0434/0448

AUTHORS: Vernov, S. N.; Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Tverskaya, L. V.; Shavrin, P. I.

TITLE: Investigation of the upper Van Allen radiation belt at low altitudes during the flights of the satellite ships and artificial earth satellites "Kosmos" from 1960 to 1963

SOURCE: Vsescyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 434-4/8

TOPIC TAGS: sputnik, artificial earth satellite, Van Allen belt, radiometry, geomagnetic field

ABSTRACT: The results of radiometric measurements of the Van Allen radiation belt from several "sputnik" and "Kosmos" satellites are discussed. The radiometers consisted of inner and outer scintillation counters and gas discharge counters. The internal scintillation counters recorded electron energies between 50 to 300 kev. Among the various recorded measurements was the variation of radiation intensity with longitude, which was quite apparent in the outer belt and which could be explained clearly by the structure of the actual geomagnetic field. Several

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ACCESSION NR: AT5023616

altitude versus longitude particle drift trajectory curves were obtained to explain the various geomagnetic anomalies observed. Next, ata were obtained to determine the location of maxima in the outer Van Allen belt. Over a period of four years this varied within the limits  $4 \le L \le 6$ , and this variation could be associated with geomagnetic disturbances. As a third observation, an electron energy gap was discovered between the outer and inner radiation belts on  $2 \le L \le 3$ . The special prefile of the outer Van Allen belt is shown to be characterized by the location of a maximum, a maximum radiation intensity  $I_{max}$ , and a half-width corresponding to 0.5  $I_{max}$ . Intensity measurements and geomagnetic line-of-force cross section estimates gave the following values for the electron lifetimes in the outer belt: for electron energies > 100 kev,  $T = 5 \times 10^5$  sec, for energies > 600 kev,  $T = 5 \times 10^7$  sec. Orig. art. has: 13 figures and 1 formula.

ASSOCIATION: none

SUBMITTED: 02Sep65

ENCL: O()

SUB CODE: AA,SV

0

NO REF SOV: 015 Card 2/2 hd

OTHER: 012

AMD DDDGG. 4

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TVahorana, 1. B.

Kernovskiy, M. J. en Tversheya, 1. Manario devalues of a certain feature 17

( On the calculation of the field of sound), Storank trudov Kiyevsa, in-ta miroinzhenerov, Issue 1, 1948, p. 134-35.

So: U-3261, 10 April 53, (Letopis 'Zhurnal 'nykh Statey, 10, 12, 1949).
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是一个人,我们就是一个人的人,我们就是一个人的人的人,我们们就是一个人的人,我们们们的人们的人,我们们也没有一个人的人的人,我们们也没有一个人的人的人,我们们也

TVERSKAYA, M.Ya. [Tvers'ka, M.IA.]; SHAKH, TS.I.; KAGAH, F.Ye. [Kahan, F.IU]

Efficient use of antibiotics in medicine. Farmatsev. zhur. 12 no.2: 10-13 '63. (MIRA 17:10)

1. Kiyevskiy institut usovershenstvovaniya vrachey.

PASTERNAK, M.N.; TYERSKAYA, M.Ye.; RAYTRUB, B.A. (Moskva)

Functional state of the liver in some infectious diseases. Klin.med.
35 [i.e.34] no.1 Supplement:35 Ja '57. (MIRA 11:2)

1. Iz kliniko-diagnosticheskoy laboratorii Institute infektsionnykh bolezney AMN SSSR (dir. - deystvital'nyy chlen AMN SSSR prof. L.V.

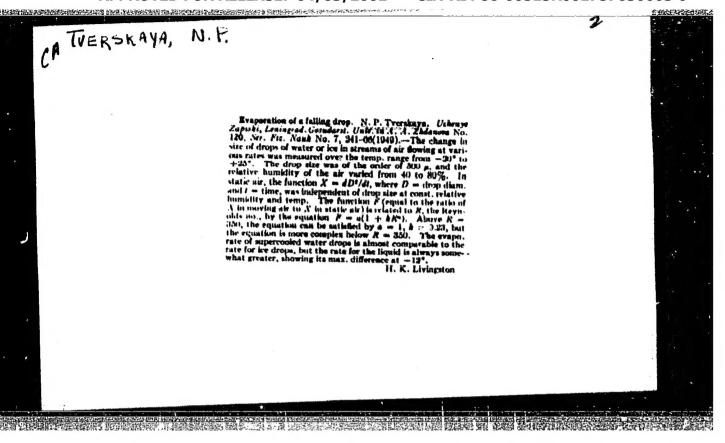
Gromanhovskiy)

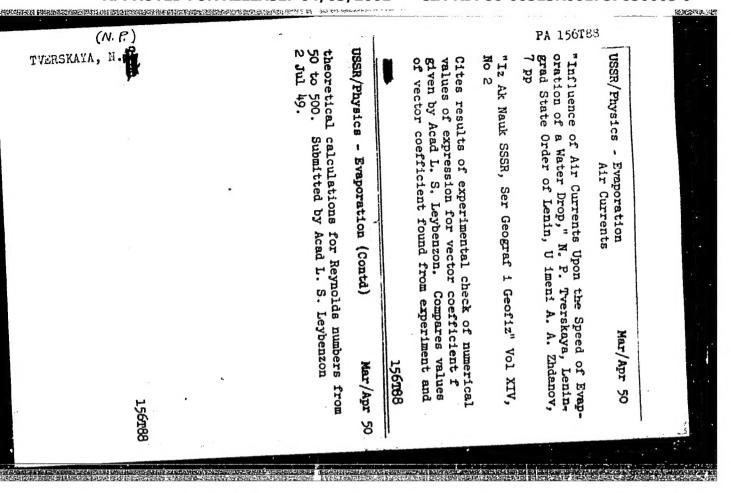
(GOMMUNICABLE DISEASES) (LIVER)

VAYSMAN, G.A. [Vaisman, H.A.]; SKVIRSKAYA, Ye.S. [Skvyrs'ka, L.S.];
GUREVICH, M.I. [Hurevych, M.I.]; TVERSKAYA, M.Ya. [Tvers'ka, M.IA.]

Study on the production of tinctures from glycoside-containing plant material using ultrasonics. Farmatsev.zhur. 19 no.1:44-49 (MIRA 18:5)

l. Kafedra tekhnologii lekarstvennykh form i galenovykh preparatov Kiyevskogo instituta usovershenstvovaniya vrachey i Institut fiziologii AN UkrSSR.





TUER AIR 27

TVERSKAYA, 11. P.

Influence of a current of air on the rate of evaporation of a drop of water. Millbank-london, 1951. 8 p., diagrs. (Royal Aircraft Establishment. Farnborough, Library Translation no. 367).

Trans. of Vliianie potoka vozdukha na skorosti ispareniia kapeli

vody.

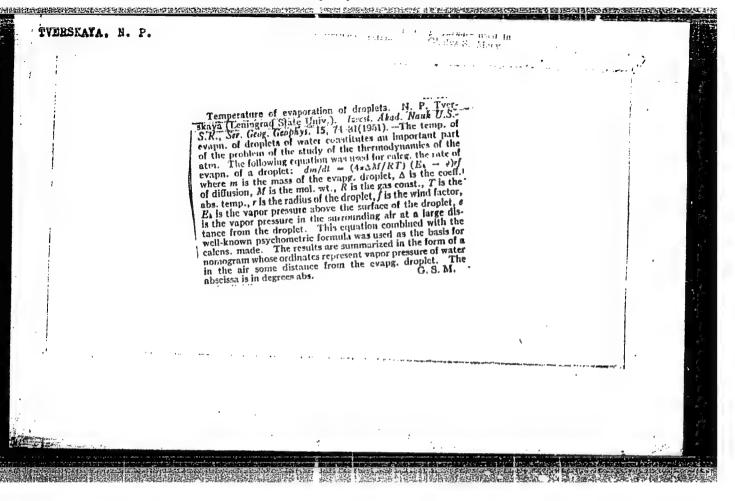
DLC: GPRR

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

APPROVED FOR RELEASE: 04/03/2001 CIA-RDP86-00513R001757630003-9"

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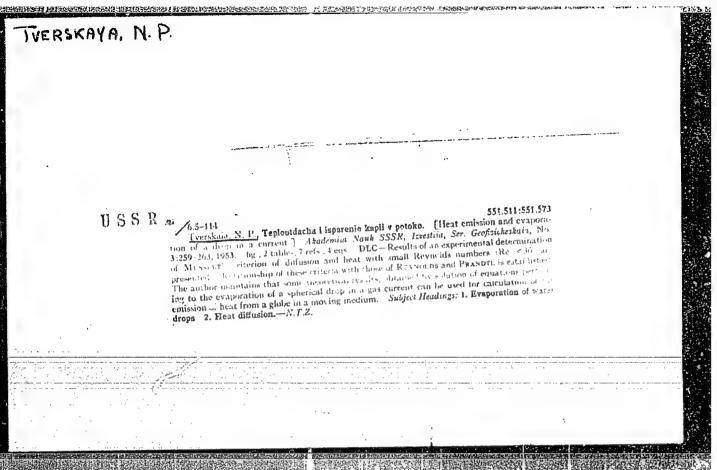
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Determining the number of the condensation nuclei in the atmosphere.
Wauch.biul. Len.un. no.31:16-19 153. (MLRA 10:3)

1. Kafedra fiziki atomosfery. (Atmospheric nucleation)



TVERSKAYA, N. P.

"Problem of Determining the Effective Coefficient of Water Drop Collision". Tr. Gl. Geofiz. Observ, No 47, Fr 112-118, 1954

A method of experimental study of the coefficient C of drop merging at collision is described. Assults of drop merging of 0.5 to 1.5 mm radius at 18 C and 40% relative humidity are presented. The mechanism of merging is established. At relatively high drop velocities the liquid does not merge and the drop is disrupted. (RZhFiz, No 9, 1955)

SO: Sum No 812, 6 Feb 1956

14-57-7-14647

Referativnyy zhurnal, Geografiya, 1957, Nr 7, pp 60-61 (USSR) Translation from:

Tverskaya, N. P., Yudina, N. P.

Experimental Investigation of Water-Drop Conjoining AUTHORS: TITLE:

(Rezul'taty eksperimental'nogo issledovaniya koagu-

lyatsii kapel' vody)

Tr. Leningradsk. gidrometeorol. in-ta, 1956, Nrs 5-6, PERIODICAL:

pp 263-267

The authors continued their previously started investigation (RZhGeogr, 1956, 2817) with the aim of determi-ABSTRACT:

ning the effectiveness coefficient of collisions (K3),

and in an effort to clarify the mechanics of large drop formation. The experiments were conducted on the

drops of identical sizes (2.3 mm and 1.2 mm) and also on the drops of various sizes (2.3 mm and 2 mm; 2.3 mm and 2.1 mm; 1.3 mm and 1.7 mm; 1.1 mm and 0.5 mm).

Card 1/3

14-57-7-14647

Experimental Investigation of Water-Drop (Cont.)

The formerly constructed apparatus was used again, but it was altered to the extent that the air in the camera could be either dessicated or humidified. The extent of the zone of conjoining  $\xi$  was derivated in respect to the velocity V at the moment of impact at a termined in respect to the velocity V at the moment of impact at a termined in respect to the velocity V at the moment of impact at a termined in respect to the velocity V at the moment of impact at a termined in respect to the velocity V at the moment of impact at a termined to 18° C. By the zone of conjoining the authors understand that 16° to 18° C. By the zone of conjoining the authors understand that deviation of the center of the upper drop from a vertical line passing through the center of the lower drop at which the conjoining passing through the center of the lower drop at which the conjoining of the two drops ceases to occur. For the drops of equal sizes at of the two drops ceases to occur. For the drops of equal sizes at of the zone of complete V = 30 cm/sec and f = 36 percent, the extent of the zone of the conjoined sitional grops, is equal to 28 percent. As the amount of translocation of the drop centers is increased, there is formed a translocation of the drop centers is increased, there is formed a translocation at zone within which K is (the ratio of the number of conjoined sitional zone within which K is (the ratio of the number of conjoined at the translocation equal to 38 percent all the impacts become At the translocation equal to 38 percent all the impacts become an ineffective. At f = 93 percent, the extent of the zone of full Card 2/3

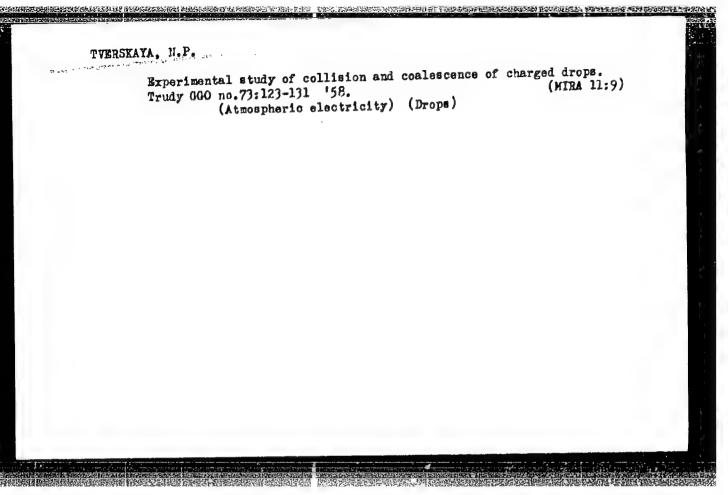
14-57-7-14647

Experimental Investigation of Water-Drop (Cont.)

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conjoining expands so as to include the deviations of 43 percent without altering the extent of the transitional zone. The relation of the zone of conjoining to V for various sizes is expressed graphically. In all the cases, the increase of the velocity leads to the diminuition of this zone, and the rate of diminuition is more uniform for the smaller drops. It can also be seen from the graphs that the zone of conjoining increases with the increase of <u>f</u>, which fact can be probably explained by the intensification of drop evaporation and by the acceleration of the vapor flow from the drop surface to the air. The impacts of the drops 1.1 mm in size against those 0.5 mm in size were more effective than the impacts of drops with any other size relations. The results of these experiments agreed fully with those of the previous work. The article includes a bibliography of 10 titles.

Card 3/3



#### "APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R001757630003-9

51

B

L 1171111-66 EWT(1) CW
ACC NR: AR6000719

SOURCE CODE: UR/0124/65/000/009/B106/B107

AUTHOR: Tverskaya, N. P.

TITLE: Exchange of turbulence in clouds of vertical development

SOURCE: Ref. zh. Mekhanika, Abs. 9B701

REF SOURCE: Tr. Leningr. gidrometeorol. in-ta, vyp. 22, 1964, 73-82

TOPIC TAGS: meteorologic observation, turbulent boundary layer, atmospheric turbulence, atmospheric cloud, synoptic meteorology

ABSTRACT: Calculation of the turbulence coefficient K, on days when cumulus and cumulonimbus clouds were observed, was performed for the boundary layer according to the equation of D. L. Laykhtman  $(K = W_1H^4|g^3 \ln(\theta_H/\theta_0)^3]$ , and for the free atmosphere according to the Matveyev equation:  $K = (V^2/\beta)[2.3 \lg \beta - 1.6 \lg (\gamma_0 - \gamma) - 0.072]$ . Data of the temperature—wind sounding of the atmosphere in Voyeykovo were employed. The obtained K values fluctuated widely. In the boundary layer the turbulence coefficient was most frequently within the interval of 25--96 m²/sec; the maximal value of 188 m²/sec was obtained on 23 June 1960. In almost all cases K was greater during the day than in the mornings or evenings; with increased cloudiness K increases comparatively slowly. Calculation of K for the free atmosphere was performed for the cases when cumulonimbus cloudiness of 8--10 balls and vertical spread from 8 to 10 km was observed; in these cases the sounding data can be related to clouds. Plots are given for the

Card 1/2

#### "APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R001757630003-9

I, 1,711,11-66 EWT(7) GW

SOURCE CODE: UR/0124/65/000/009/B106/B107

AUTHOR: Tverskaya, N. P.

51

TITLE: Exchange of turbulence in clouds of vertical development

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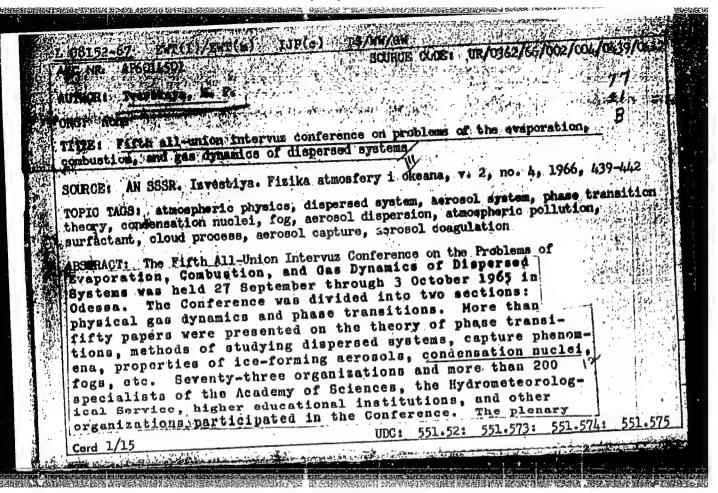
SOURCE: Ref. zh. Mekhanika, Abs. 9B701

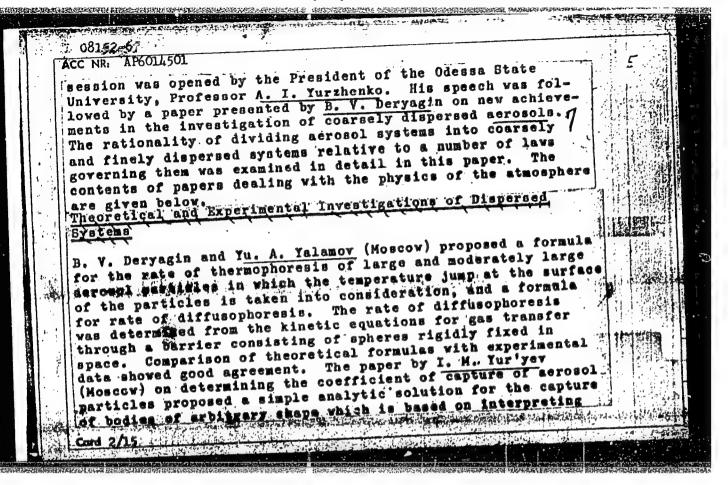
REF SOURCE: Tr. Leningr. gidrometeorol. in-ta, vyp. 22, 1964, 73-82

TOPIC TAGS: meteorologic observation, turbulent boundary layer, atmospheric turbulence, atmospheric cloud, synoptic meteorology

ABSTRACT: Calculation of the turbulence coefficient K, on days when cumulus and cumulonimbus clouds were observed, was performed for the boundary layer according to the equation of D. L. Laykhtman  $(K = W_z H^4)g^2 \ln (\theta_H/\theta_0)^2$ , and for the free atmosphere according to the Matveyev equation:  $K = (V^2/\beta)[2.3 \text{ ig } \beta - 1.6 \text{ ig } (\gamma_0 - \gamma) - 0.072]$ . Data of the temperature—wind sounding of the atmosphere in Voyeykovo were employed. The obtained K values fluctuated widely. In the boundary layer the turbulence coefficient was most frequently within the interval of 25--96 m<sup>2</sup>/sec; the maximal value of 188 m<sup>2</sup>/sec was obtained on 23 June 1960. In almost all cases K was greater during the day than in the mornings or evenings; with increased cloudiness K increases comparatively slowly. Calculation of K for the free atmosphere was performed for the cases when cumulonimbus cloudiness of 8--10 balls and vertical spread from 8 to 10 km was observed; in these cases the sounding data can be related to clouds. Plots are given for the

Card 1/2





L 08152-67 ·· the motion of aerosol particles as "flows of a pseudoliquid." ACC NR: AP6014501 The accuracy of the formulas was verified by comparing them with known calculations of the local capture coefficient for an ellipse. The problem of fog formation in a Wilson cloud chamber was discussed by M. V. Buykov and V. P. Bakhanov (Kiev). The equations for steam temperature in the chamber, supersaturation of steam, and the distribution functions by size of the liquid-phase nuclei were solved. In their solutions the authors took into account the heat exchange with ... the surrounding medium and the heat loss in condensation. V. L. Sigal and M. V. Buykov (Kiev) solved the problem of intense evaporation of drops of a solvent when the law of change with time in drop radii is known and independent of concentration. Diffusion of the solute within the drops plays a large role in these processes. However, the concentration field is determined by the time required for the first crystals to form in a drop. I. P. Mazin (Moscow) reported on a method for taking account of the relaxation times in the transition from temperature fluctuations to humidity fluctuations, which must be taken into account in forming cloud droplet spectra. V. I. Smirnov (Moscow) pointed out the need for taking account of turbulent Brownian congulation of charged aerosols which affects the congulation Card 3/15

Se 2. 3 3. with ACC NR. AP601450' Y. H. Voloshchuk (Krivoy Rog) presented an interesting communication on the theoretical calculation of the capture coefficient of particles in a flow with high Stokes numbers. L. M. Royev, A. V. Levin, and B. Ye. Fishman (Kiev) gave a report on the dependence of saturated vapor pressure on temperature. The paper by G. L. Babukh and A. A. Shrayber dealt with an investigation of the mechanism of the motion and heating of a dispersed-substance for a two-fraction material and continuous particle-size distribution. Dispersed particles in a two-phase flow rotate because of collisions of particles having rough surfaces. The authors also discussed the results of studies of the motion and heat exchange tof particles in a pulsed gas flow. near exchange of parvists with the paper by V. P. Belyakov, M. L. Dranovskiy, S. I.
Sul'zhenko, and A. K. Gimonovskiy (Moscov) was devoted to the results of studies on the behavior of drops of a liquid in an acoustic field. An equation was derived for the motion of spherical and cylindrical bodies in an acoustic field. When flows move around drops at varying velocities, the drops have a different resistance coefficient from that which would exist for flows at a constant velocity. Critical Weber numbers characterizing the stability of drops in an acoustic field were determined experimentally. The drop-Cord 4/15

L 08152-67

ACC NR: AP6014501

disintegration time was determined as a function of the parameters of the liquid and the acoustic field.

K. B. Tolpygo and A. V. Chalyy (Kiev) solved the inverse problem of the theory of light scattering and proposed utilizing the indicatrices of radiation scattered forward and backward through the boundaries of the medium to reconstruct the function of the distribution by size of scattered particles of the medium.

Methods and Apparatus for Investigation of Dispersed Systems

The paper by S. M. Kontush and V. A. Fedoseyev (Odessa) dealt with special features of measuring the microphysical characteristics of hygroscopic smoke by studying the confiensational growth of smoke particles. A jet-type device was used for this purpose. It was found that the characteristics obtained for some smokes could be described analytically with the aid of a logarithmic normal distribution.

L. V. Ivanchenko and S. M. Kontush (Odessa) reported on basic design features of continuously operating automatic counters, resembling the VDK counters. They point out that

Card 5/15

APPROVED FOR RELEASE: 04/03/2001 CIA-RDP86-00513R001757630003-9"

وأند والمراجع والمراجع ACC NR: AP601/501 special attention must be devoted to calibrating instruments when investigating the dispersed composition of aerosols. V. K. Yeroshov, G. Ya. Vlasenko, and B. V. Deryagin (Moscow) reported on the construction of a photoelectric attachment for a continuously operating VDK-4 bultramicroscope, Ddesigned to automate the counting of electrical pulses appearing in a photomultiplier tube caused by the light reflected from aerosol particles passing through the illuminated zone of the cell of the instrument. The photoelectronic attachment has an FEU-29 electronic multiplier, a "Siren' "-type ampli-fier, and B-2 and B-3 counting devices. The attachment registers pulses from particles larger than 0.2  $\mu$  with the concentration measured varying from 106 particles/sec3 with an accuracy of 15-20%. Light scattering by the cell becomes commensurate with the light pulses from particles with diameters less than 0.2 µ. The formulas used in calculating the concentration of an aerosol system are the same as those used in ordinary VDK instruments without the attachments. Y. A. Shnaydman and N. A. Kisel' (Odessa) reported on a device they designed for finding the particle distribution Card 6/15

1. 08152-67 ACC NR: AP6014501 function by size and the average size of the particles, The laboratory-field apparatus includes: FIOPS-a photoelectric device for measuring the optical density of the medium, a VDK-4, filters for determining the concentration by weight of smokes, and a cascade impactor for determining the distribution function and the average size of smoke particles. Laboratory investigations showed that in practice the distribution function does not depend on the air humidity. Measurements taken under natural conditions showed that growth of particles up to the maximum size (1.5-2 µ) takes place close to the source. Microstructural characteristics are measured as functions of the distance from the source, the height at which measurements are taken, and local factors. Microstructural measurements can be processed by the L. M. Levin method. lyley (Leningrad) reported on an aerostatic impactor and automatic calculation of samples. Changes in the Properties of Dispersed Particles Adported by Various Aided Reagents Many papers were devoted to discussion of changes in the rate of drop evaporation during artificial modification.

ACC NR. AP6014501 B. V. Deryagin, L. A. Rozentsvayg, and V. A. Fedoseyev (Odessa) discussed changes in the rate of evaporation of drops kept for various periods of time in cetyl alcohol vapor. Information was obtained on the kinetics of adsorption and the formation of monolayer films from the gaseous medium on the surface of the drops. A determination was made of the dependence of the degree of saturation of a monolayer on the cetyl alcohol vapor concentration in the flow. The paper presented by L. F. Leonov and B. S. Prokhorov (Moscow) was devoted to the results of studying the rate of formation of a monolayer on a drop of water from the vapor and dispersed phases of a surfactant. The rate of evaporation or condensation of drops of water can be changed by introducing either hygroscopic substances or surfactants, with fundamentally different effects on the above-mentioned processes. Insoluble surfactant films on drops reduce the rate of evaporation significantly more than do hygroscopic substances. The rate of formation of a monolayer from vapors of insoluble surfactants was studied by the "lying" drop method (changes in the surface tension of drops kept in

Card 8/15

1. 1 33,53-57 ACC NR: AP6014501 The dependence of the surfactant vapor were measured). surface tension of drops on the time they remained in surfactant vapors permits one to estimate the spreading rate of a monolayer. This spreading takes place very slowly over several hours. The paper by B. K. Ivanitskiy and Yu. I. Shimanskiy (Kiev) presented the results of an investigation of the rate of evaporation of drops from an aqueous solution of the surfactant, trimethyl alkyl ammonium chloride, in different volumetric concentrations at 20C and relative humidities of 15, 53, 75, and 94%, under pressures of 750 to 25 mm Hg. The surfactant noticeably decreases the rate of evaporation when an adsorbing layer is formed. The radius varies linearly with time. The rate of evaporation of the surfactant depends slightly on changes in pressure for all relative humidities. The decrease in surface temperature of drops was insignificant. The evaporation coefficient was calculated on the basis of experimental data. L. I. Bolduno a, L. P. Zatsepina, and A. D. Solov'yev (Moscow) reported on the method and the results of studies of the effect of additions of surfactants on the dispersion of liquids. The authors conducted experiments involving spraying Card 9/15

ACC NR. APGOLASOL the liquid in ... a chamber free of aerosol and into a chamber containing a concentrated sodium chloride solution with and without additions of the surfactant. The effects of dispersion were compared. It was established that adding a surfactant affected the dispersion of the forming acrosol, the more so with increased molecular weight of the surfactant. Some very active surfactants reduced this effect at high molecular weights. Thus, moderately active surfactants had the greatest effect on dispersion. It was stated that the decrease in the effect of additions of high-molecular surfactants was obviously related to the decrease in the rate at which adsorption equilibrium is achieved. in solutions of these substances and with a reduction in the dynamic surface tension with high rates of drop formation. Investigation of Ice-Forming Aerosols Since 1961, personnel of the High-Altitude Geophysical

Since 1961, personnel of the High-Altitude Geophysical
Institute have been using artillery shells filled with iceforming reagents to modify hail-forming processes. A. S.
Zhikharev (Nal'chik) reported that ice-forming aerosols were
produced by exploding 5-g charges of a mixture of silver
iodide and lead iodide with hexogen. Optimal mixtures of
explosives and ice-forming reagents produced a yield of ice-

Card 10/15

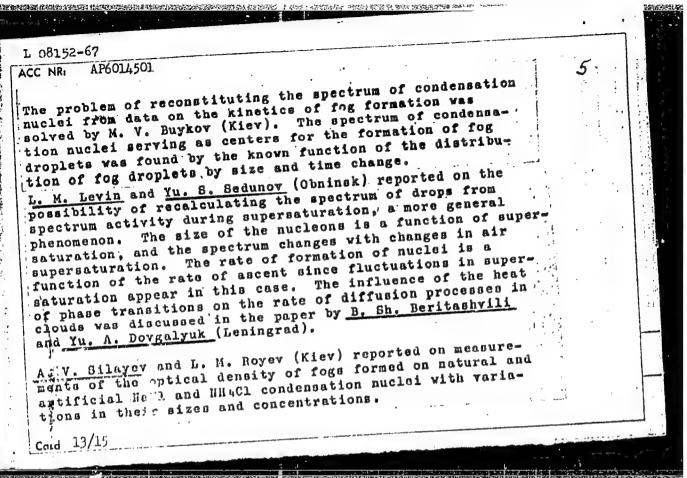
| L 08152-07  ACC NR: AP6014501  forming nuclei per gram which was as good as the pyrotech- forming nuclei per gram which was as good as the pyrotech-   | 4 |   |
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| for arming antihail devices.  for arming antihail devices.   |   |   |
| N. O. Plaude, and A. D. Strive particles. The principal problem is generating active particles. The principal problem is generating active particles. The principal μ) difficulty is obtaining highly dispersed acrosols (0.01—1 μ) difficulty is obtaining highly dispersed activity. A thermal   |   | - |
| emphasized that laboratory modeling of the processes of emphasized that laboratory mod |   |   |
| finding new active state the mechanism of ice formation on some tion is available on the mechanism of ice formation of some different substrate. The paper included a discussion of some different substrate. The paper included a discussion of some different substrate. The paper included a discussion of some different substrate. The paper included a discussion of some different substrate. The paper included a discussion of some different substrate.  |   |   |
| by synthesizing new ice-forming substances and by improved new ice-forming new ice-formi |   |   |
| The paper by D. Malking, V. V. Patrikeyev, and M. R. Card 11/15  |   |   |

Mamedoy (Moscow) was devoted to the use of organic substances to stimulate crystallization of cloud drops as an antihail measure. Three new organic substances were found which have a high temperature threshold for crystallization which have a pronounced deforting effect on drops. They and which have a pronounced deforting effect on drops. They are plentiful and cheap. I. G. Kuntsevskiy and L. M. Royev (Kiev) proposed a design for ice crystal generators.

# Processes in Clouds and Fogs

Card 12/15

The paper of M. I. Dekhtyar and M. V. Buykov (Kiev) dealt with the formation and development of a stratus cloud based on the use of the kinetic equation for the distribution on the use of the kinetic equation for the distribution function of cloud drops, taking sedimentation and the function of cloud drops, taking sedimentation and temperature into consideration. The evolution of the spectrum of cloud drops was considered in stages: 1) growth due to condensation while rising in an air current (even though condensation while rising in an air current (even though stage); and 2) growth while falling through a cloud due to stage); and 2) growth while falling through a cloud due to condensation or due to condensation and gravitational coagucondensation or due to condensation and gravitational coagucondensation in temperature, and supersaturation with height are derived for each stage.



ACC NR: A16014501

Experimental investigations of the Capture Coefficient

A paper by A. V. Stavitskaya and Ye. N. Ovchinnikova (Odessa) presented the results of the method developed and an investigation of local capture coefficients by a disk-shaped barrier. The dependence of the capture coefficient on the distance from the center of the disk was found.

The results of investigating the capture and coagulation of an aqueous acrosol by a horizontal filament were discussed in the paper of N. G. Vereshchago and Ye. N. Ovchinnikova. (Odessa). Formulas were derived for determining the effectiveness of settling of an aqueous acrosol on a fine filament; these formulas have been verified experimentally.

The paper of N. S. Shishkin (Leningrad) on conditions for development of snow, snow pellets, and hail in supercooled regions was presented at the concluding plenary session. The growth of ice particles in clouds is determined by the conditions for their condensation and coagulation with cloud drops and by heat-transfer processes. In transitions from snow to snow pellets, the rate of growth of the mass of a particle due to coagulation with supercooled drops exceeds

Card 14/15

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ERFUSSI, Ya.I., red.; TVERSKAYA, Sh.D.[translator]; DANILOV, N.A., red.; DZHATTIEVA, F.Kh., tekim. red.

[Pulse methods for television measurements] Impul'snye metody televizionnykh izmerenii; sbornik statei. Moskva, tody televizionnykh izmerenii; sbornik statei. Moskva, izd-vo inostr. lit-ry, 1961. 114 p. Translated articles.

[NIRA 15:4)

(Television—Measurement)

Tyendovskiy, N.P., uchitel

Our suggestions. Khim.v shkole 15 no.1:60-61 Ja-F '60.

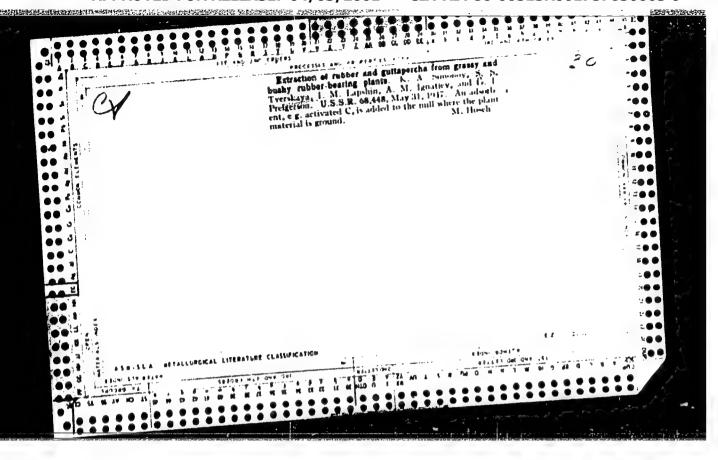
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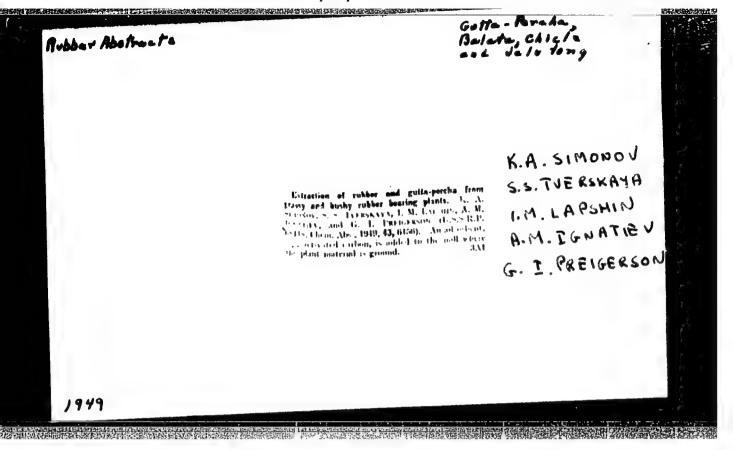
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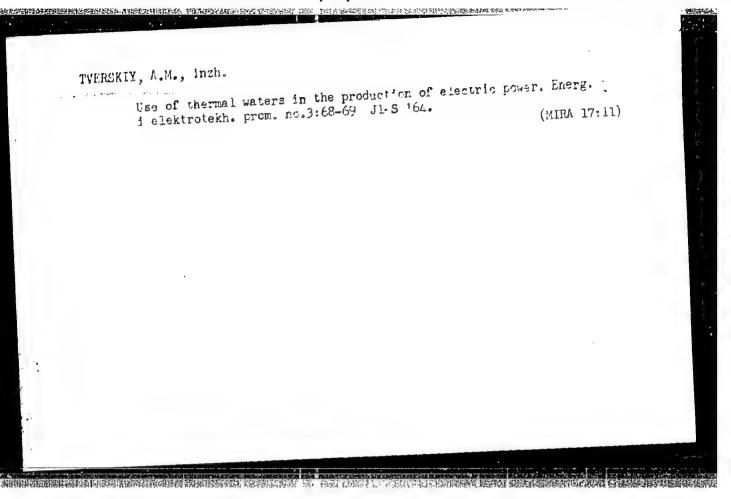
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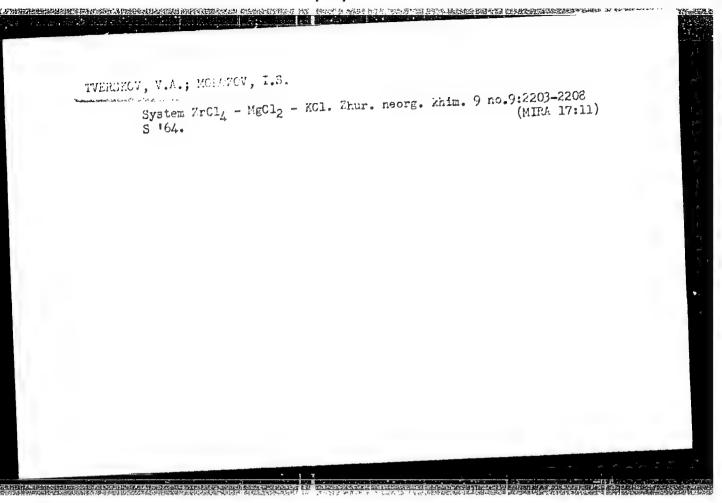




SAVCHUK, S.I., kand. tekhn. nauk; TVERSKOY, A.M., inzh.

Trends in the scrubbing of flue gases. Teploenergetikn 12 no.8:
(MIRA 18:9)
89-90 Ag 165.

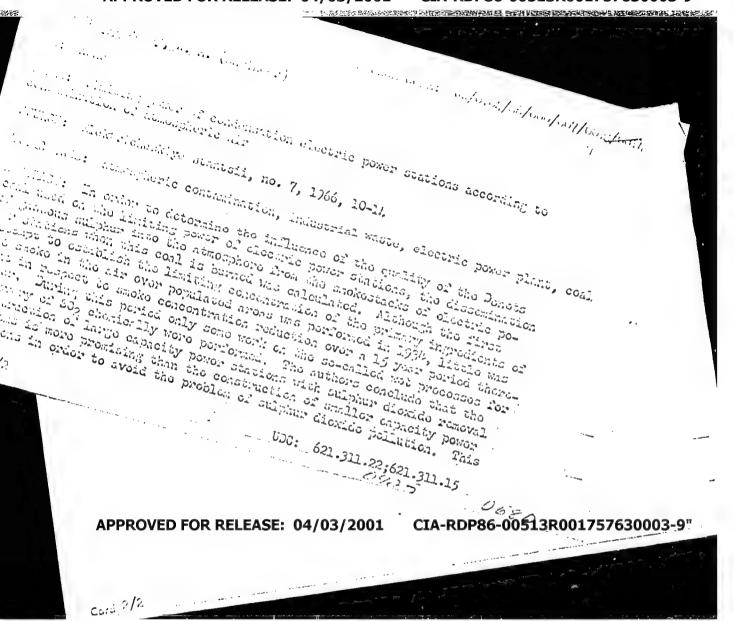


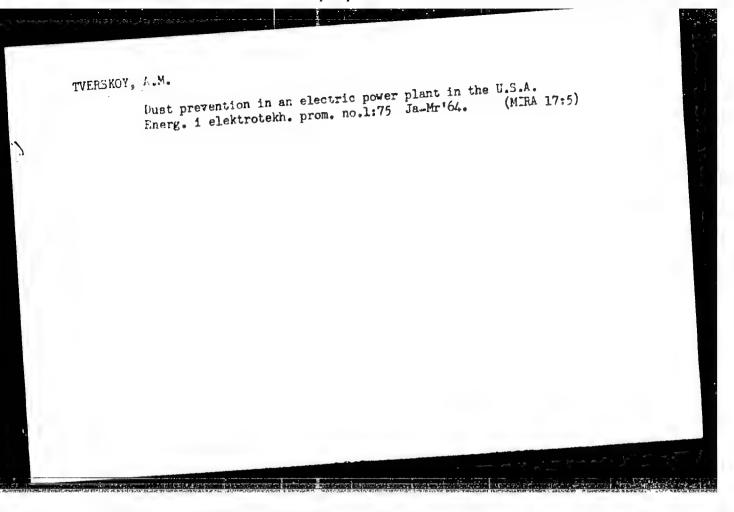


TVERSKOY, A. D. Nasha Koneuodcheskaya Ferma. (Proizvod. Opyt Geroev 25155, TUERSKOY, A. D. Nasha Koneuodcheskaya Ferma. (Proizvod. Opyt Geroev Sots. Truda K. N. Mayatskogo I. P. U. Shaforstoua. Kolkhoz Im. Eudennogo-Sots. Truda K. Rayon Staurop. Kraya.) Konevodstuo, 1949, No. 4, S. 33-37

Apanas'eusk. Rayon Staurop. Kraya.) Konevodstuo, 1949, No. 4, S. 33-37

SO: Latopis' No. 33, 1949





TVERSKOY, B. A.

"On the Cuestion of Light Element Formation in Stellar Atmospheres,"

paper presented at the 10th Gen. Assembly, Intl. Astronomical Union, 13-20 Aug 1958, Moscow,

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31800 s/203/61/001/005/001/028 A006/A101

24.5200

AUTHOR:

Tverskoy, B.A.

TITLE:

On the problem of convection in a rotating sphere. I.

PERIODICAL:

Geomagnetizm 1 aeronomiya, v. 1, no. 5, 1961, 629 - 637

The author studied convection in a rotating sphere for the purpose of applying the results to problems of terrestrial magnetism. The method of vector analysis and a visual model were employed to investigate quasi-elastic properties of a rotating ideal liquid, low oscillations in a rotating isentropic sphere and least stable disturbances. On the basis of data on the viscosity of the earth's core substance it can be confirmed that rotation plays an important part since Coriolis forces are much stronger than viscous stresses arising during motion at a scale of order of core radius a. It is shown that at weak superisentropic overheating convection in the rotating sphere is brought about either by the transposition of adjoining force tubes of the rotor of velocity  $\Omega$ , or by the oscillation of adjoining force tubes of the rotor of velocity  $\Omega$ . tions of these tubes along  $\Omega$ . In both cases the spatial parameter of such oscillations of these tubes along  $\Omega$ . In both cases the spatial parameter of such oscillations of these tubes along  $\Omega$ . lations, transverse in respect to  $\Omega$ , is small in comparison to radius a of the The results obtained are compared with low-pressure plasma in a strong sphere.

Card 1/2

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On the problem of convection ...

magnetic field. At small deviations from isentropy, only low frequency oscillations can arise. Considering the form of these oscillations it can be concluded that convection must have the nature of two-dimensional turbulence. The following conclusions are drawn: if the density of kinetic energy of a disturbed motion is low as compared to the density of rotation energy, the force tubes of the rotor of velocity  $\Omega$  acquire elasticity to bending, tilting and twisting. These results can be used as a zero approximation when studying convection in a rotating gravitating sphere for the case when excessive gravitational energy connected with non-uniform heating is much below the kinetic energy of rotation. Hence, the basic scale, velocity in the basic scale of turbulence and factors of turbulent transfer can be determined. This will be dealt with in part II of the article. The author thanks Academician M.A. Leontovich for his assistance. There are 2 figures and 10 references: 5 Soviet-bloc and 5 non-Soviet-bloc.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonoseva (Moscow State University imeni M.V. Lomonosov) Institut yadernoy fiziki

(Institute of Nuclear Physics)

SUBMITTED: July 4, 1961

Card 2/2

APPROVED FOR RELEASE: 04/03/2001 CIA-RDP86-00513R001757630003-9"

# "APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R001757630003-9

31801 s/203/61/001/005/002/028 , A006/A101

245200

AUTHOR:

Tverskoy, B.A.

TITLE:

On the problem of convection in a rotating sphere. II.

PERIODICAL:

Geomagnetizm i aeronomiya, v. 1, no. 5, 1961, 638 - 645

The author investigates stationary conditions of turbulent convection in a rotating gravitating sphere. The properties of this motion are studied, namely: motion in the basic scale; local properties of turbulence, turbulent heat conductivity and steady temperature distribution, and heat transfer parallel to the rotation axis. It is shown that convection has the nature of two-dimensional turbulence with basic scale  $1 \sim \alpha$  and velocity in this scale  $v_0 \sim \alpha^2 a \Omega$ . The basic scale is determined from the condition of equality of work required for the transposition of two adjoining force tubes with radius ~ lo and the work of Archimedean force at this transposition. It was found that turbulence was uniform and isotropic, and that the interaction of transverse and longitudinal oscillations of tubes manifests itself only in the second order in respect to od. It can therefore be considered that the flux of energy, continuously transferred from larger scales of transverse motion to smaller ones, is constant. Consequently, there is a full

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31801 s/203/61/001/005/002/028 A006/A101

On the problem of convection ...

analogy with a three-dimensional problem on local properties of a developed turbulence, and results obtained for the three-dimensional case can be applied to twodimensional turbulence. Stationary temperature distribution is obtained from the equation of turbulent thermal diffusivity with the transfer factor  $\chi_{\text{tweb}} \sim l_0 v_0$ . Conditions are analyzed when two-dimensional turbulence is preferable to other processes. The author analyzes the application of results obtained to the earth's core. The following parameters of the core are given; radius a  $\approx 3.10^{\circ}$  cm,  $\Omega \approx 10^{-5}\,{\rm sec^{-1}}$ ,  $\rho \approx 10$  g/cm<sup>2</sup> and  $C \approx 0.1$  cal/g. degree; % in the core will exceed X value under normal conditions (0.1 - 0.7 cm/sec in the case of metals) by a factor of 5 - 10;  $\beta$  factor is supposed to be  $\sim$  10-6 1/degree:  $Q \lesssim 4.10^{-14}$  factor of 5 - 10;  $\beta$  factor is supposed to be  $\sim$  10-12 10-13 so that the basic cal/cm<sup>2</sup> sec. Number q at such parameters is  $\sim$  10-12 10-13. From the scale 10 is about 3.10 cm;  $\gamma$   $_{\rm C} \sim 1$  - 3 cm/sec, and Re  $\sim$  106 : 107. From the condition of steadiness it is found that the described conditions are attained at condition of steadiness it is found that the described conditions are attained at condition of steadiness it is found that the described conditions are attained at condition of steadiness it is found that the described conditions are attained at condition of steadiness it is found that the described conditions are attained at condition of steadiness it is found that the described conditions are attained at conditions are limit to not known and many suthers suppose 3 to be about 0.1 however, the lower limit is not known and many authors suppose V to be about 0.1 - 0.01 cm<sup>2</sup>/sec. At large V when  $1 < R < P^2$ , convection remains apparently twodimensional, but has a self-oscillating nature. When  $R \lesssim 1$  Chandrasekhar conditions arise. Ref. 2: S. Chandrasekhar. Proc. Roy. Soc. 1953, vol. 217, 306).

Card 2/3

31801 8/203/61/001/005/002/028 4006 /4101

On the problem of convection ...

 $\gamma$  must then be  $\geq$  10<sup>6</sup>cm<sup>2</sup>/sec. The author thanks Academician M.A. Leontovich for his assistance. There are 7 references: 6 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova (Moscow State University imeni M.V. Lomonosov) Institut yadernoy fiziki (Institute of Nuclear Physics)

SUBMITTED: July 4, 1961

Card 3/3

31:354 s/203/61/001/006/007/021 DO55/D113

AUTHOR:

TITLE:

Contribution to the theory of Coulombian scattering of fast

electrons in the Earth's outer radiation belt

Geomagnetizm i aeronomiya, v. 1, no. 6, 1961, 902-910 PERIODICAL:

TEXT: The Coulombian scattering of fast electrons on a sold, completely ionized plasma in symmetrical magnetic traps is investigated. A kinetis equation is derived for the function of distribution in the plane of symmetry, and a general solution is given for the corresponding problem with initial conditions. Numerical results are given for the case of a linear and approximately point dipole with a constant density of the cold plasma. It is shown that the breakdown of electrons is conditioned mainly by losses of energy in collisions, while scattering in plugs plays hardly any part. The duration of various angular harmonics is calculated, and it was found that the time that the first harmonic maintains its initial angular distri-

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Contribution to the theory ...

bution is comparable with the life of an electron. The other harmonics are quickly attenuated as a result of collisions and the corresponding particles are distributed isotropically according to angles with hardly any energy losses. The connection between the steady-state distribution and the angular distribution of sources is discussed on the basis of these results. Most of the electrons in the belt are distributed between the isotropic and first harmonics of angular distribution. The time in which the higher angular harmonics turn isotropic is much less than the life of an electron in the belt. This quantity tells fully determined by its initial energy E as follows:

$$t_g = \frac{10^8}{N_0} E^{3/2}$$
 sec =  $\frac{3E^{3/2}}{N_0}$  years,

where E is measured in kev,  $N_0$  in  $1/cm^3$ . The accuracy of these conclusions is limited by the assumptions that no electrons break down because of magnetic scattering and that the density of the cold plasma is constant. Although several arguments favor these assumptions, a more thorough study of

Cará 2/3

Contribution to the theory ...

S/203/61/001/c06/007/021 D055/D113

the dynamics of the outer belt is needed. There are 1 table and 9 references; 6 Soviet and 3 non-Soviet. The three English-language references are: J. Walch, W. Whitteker, J. Geophys. Res., 1959, 64, no. 8; N.C. Cristofiles. J. Geophys. Res., 1959, 64, no. 8; E. Parker, J. Geophys. Res., 1960, 65, 3117.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.

Institut yadernoy fiziki (Moscow State University imeni

M.V. Lomonosov. Institute of Nuclear Physics)

SUBMITTED: August 25, 1961

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Card 3/3

23835

S/020/61/138/002/018/024 B104/B207

3.2600

AUTHOR:

Tverskoy, B. A.

TITLE:

The effect of the external drift currents upon the magneto-hydrodynamic self-excitation of the magnetic

field of the Earth

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 138, no. 2, 1961, 348-350

TEXT: The radiation belt of the Earth which drifts in the inhomogeneous magnetic field and consists of electrons of 0.01 to 0.1 MeV, forms a circular current which has the same sign as the currents in the interior of the Earth. The maximum field strength of the circular current is 400 gamm [Abstracter's note: Unit is not defined]. Magnetic storms disturb the external radiation zone, thus, creating external currents just like in the interior of the Earth. These currents last several days and produce fields with field strengths of approximately 60 gamm in the proximity of the Earth. On the basis of experimental results, it may be said that the Earth is surrounded by a drift current the field of which is parallel to the dipole moment of the Earth in its proximity, and may be

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The effect of the external drift currents ...

regarded as homogeneous. The mean value of this field of the Earth is approximately 100 gamm. The drift current is assumed to be produced by filling up the magnetic traps of the Earth by fast electrons during magnetic storms. The occurrence of magnetic storms and their energy are determined by the solar activity and the dipole moment of the Earth. Assuming that the solar activity is constant on an average, the field strength of the drift currents near the Earth may be assumed to be determined by the following relation:

$$. \quad \dot{H}_{o} = \frac{M}{R^{3}} K(M) \tag{1}$$

M is the dipole moment of the Earth, K a dimensionless function of M. R. the radius of the Earth's core. The author investigates some conclusions from (1). Ho penetrates into the Earth's core where it interacts with the convection currents of the conducting masses. The external field may. under certain conditions, induce an additional dipole moment  $M^1$  which amplifies the main field and increases  $H_0$ . Self-excitation occurs in this case. In the figurative sense, this phenomenon may be regarded as a dynamo, whose stator is the exterior radiation belt and whose rotor is the Earth's core. The magnetic storms are the feedback. The equation

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23835

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The effect of the external drift currents...

 $\overline{M}' = qR^3\overline{H}_0$  (3) holds for any type of convective currents; in this equation, the coefficient q is a function of the character of the current and may assume values between -2 and any positive value. For kq = 1 [Abstracter's note: k is not defined] it follows from (1) and (3) that  $\overline{M} = \overline{M}'$ . kq > 1 is the condition for the occurrence of a self-excitation. If  $H_0$  is assumed to be 100 gamm on the assumption that M be quasi-equal to  $M_0$ , the following is obtained:  $k(M_0) \sim 10^{-4}$  and  $q \sim 10^4 \gg 1$ . In conclusion, the author investigates an example in which q is assumed to be very large. A

author investigates an example in which q is assumed to be very large. A convection current occurs in a homogeneous, gravitating sphere the substance of which passes over, under great pressure, into the liquid metallic state, if a negative temperature gradient exists. If the convection currents have quadrupole symmetry and the core is not large, the motion in cylinder coordinates has the following form:

$$V_z = 2V_0 z/R, V_r = -V_0 r/R, V_{\phi} = 0$$
 (5)

On the assumption that a homogeneous magnetic field  $H_z = H_o$  exists, the author derives for  $\sigma \neq 0$ , the following solution:

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The effect of the external drift currents...

$$H_r = H_{\bullet} = 0;$$

$$H_z = \begin{cases} H_0 e^{\lambda (1 - r^r/R^{\bullet})} & (0 \leqslant r \leqslant R), \\ H_0 & (r > R), \end{cases}$$
(8)

where  $\lambda = 2\pi\sigma V_0 R/c^2$ . For the dipole moment of the unit length of the cylinder the following is obtained:

$$M_1 = \frac{R^2}{4} H_0(e^{\lambda} - 1)$$
 (9).

Herefrom, it may be seen that at sufficiently great  $\lambda$  in the core, an additional dipole moment is induced for which the following holds:  $M' \sim H_O R^3 e^{\lambda}$ , i.e.,  $q \sim e^{\lambda}$ . The author thanks Academician M. A. Leontovich and Professor D. A. Frank-Kamenetskiy for their interest in the work and discussion. There are 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: S. Shapman, J. Bartels, Geomagnetism, 2, Cambridge, 1953.

Card 4/5

#### "APPROVED FOR RELEASE: 04/03/2001

#### CIA-RDP86-00513R001757630003-9

23835

S/020/61/138/002/018/024 B104/B207

The effect of the external drift currents ...

ASSOCIATION:

Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova

(Moscow State University imeni M. V. Lomonosov)

PRESENTED:

December 30, 1960, by M. A. Leontovich, Academician

SUBMITTED:

December 2, 1960

Card 5/5

IVAMENDO, I. P., TWEEKOY, B. A. and CHARMERTY, V. P.

"On the radiation belt theory"

report to be submitted for the 13th Intl. Astronautical Congress, IAF,
Varna, Bulgaria, 23-29 Dep 1952.

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TVEHSKOY B. A.

Dissertation defended for the degree of Candidate of Physicomathematical Sciences at the Institute of Atmospheric Physics in 1962:

"Problem of Free Thermal Convection in a Rotating Gravitating Sphere."

Vest. Akad. Nauk SSSR. No. 4, Moscow, 1963, pages 119-145

12258

s/203/62/002/001/006/019 1023/1223

3.2310

Tverskoy, W.A.

Oscillations of an isothermal conducting atmosphere AUTHOR:

in the presence of gravitational and magnetic fields, and harmonic pulsations of the magnetic TITLE:

field of the Earth.

Geomagnetizm i Aeronomiya, v.2, no.1, 1962, 61-67

TEXT: The investigation of plasma free oscillations is very complicated, especially for low frequencies, where the approximations of geometrical optics do not arrive any more. For each system the corresponding boundary value problem has to be solved. The magnoto-hydrodynamic oscillations of ionosphere are investigated, assuming that: a) an isothermal atmosphere fills the half-space z>0 above a rigid plane; b) the magnetic field H is perpendicular to the gravitational field g (parallel to the boundary plane; c) the gas conductivity is high enough to enable the

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Oscillations of an isothermal...

assumption that the lines of force are frozen in the matter; d) the frequencies are lower than the ionic cyclotron frequency in a field II. The one-dimensional oscillations along the z-axis are described by a system of equations: Euler's equation, continuity, freezing-in of force lines and adiabaticity. The change in the adiabatic exponent from 5/3 in dense layers of the atmosphere to 2 in rarified layers hardly influences the results. The spectrum of frequencies is discrete. The extreme cases are analyzed: weak and strong magnetic fields. Separate harmonics can be resonantly excited by turbulent motions in the atmosphere. The theory gives a qualitative picture of magnetic pulsations, explains their mono-chromac character and gives an order of magnitude estimate of the corresponding frequencies.

ASSOCIATION: Moskovskiy gosundarstvennyy universitet, Institut yadernoy fiziki (The Moscow State University,

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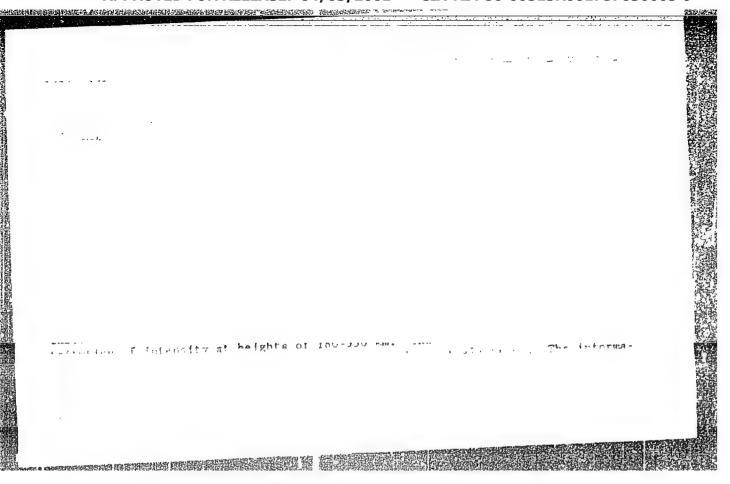
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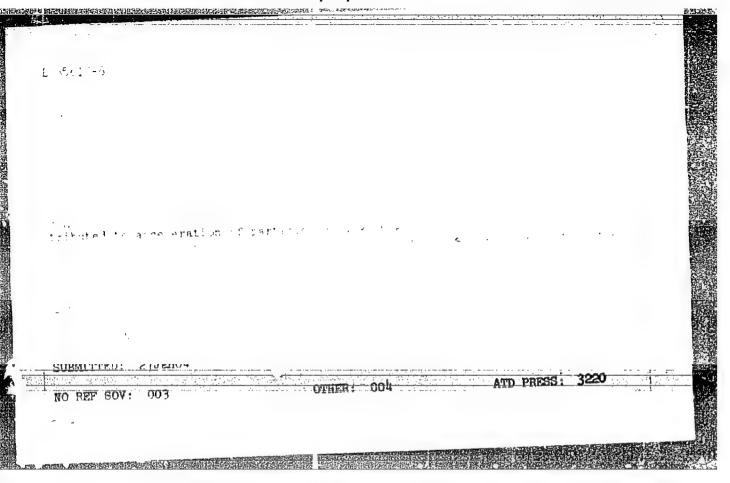
Oscillations of an isothermal...

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SUBMITTED: November 3, 1961

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s/203/62/002/012/017 1046/1246

3.9110 (2765,4705)

AUTHOR:

Tverskoy, B.A.

TITLE

Magnetohydrodynamic properties of two-dimensional turbulence in

a rotating sphere

PERIODICAL: Geomagnetizm i aeronomiya, v.2, no. 2, 1962, 326-331

Any magnetic field that sets in within a rotating gravitating sphere orients itself rapidly along the axis of rotation if a) the magnetic force lines are frozen into the substance of the sphere  $(4\pi\pi e^2 \gg 1)$ , and b) the relaxation of Batchelor's spontaneous field takes but a short time  $(4\pi e^{2}/c^{2} < 1)$ . Near the equatorial belt, the turbulent convection loses its two-dimensionality becoming isotropic. The magnetic flux through the plane of the equator is thus conserved, and the stationary field in the sphere is determined uniquely by this constant. Outside the sphere, even near its surface, the field is that of a magnetic dipole. Combining this fact with considerations of feedback effects for two-dimensional turbulence, the author arrives at correct figures for actual field intensities (5 to 10 gauss in the core, and 0.5 to 1 gauss on the surface of the earth). Since in principle two-dimensional

Card 1/2

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Magnetchydrodynamic properties ...

turbulence is possible in the terrestrial core ( $\eta \lesssim 1000$  poise), this result shows that the geomagnetic field may be generated and sustained by this particular mechanism. The most important English reference reads: G.K. Batchelor, Proc. Roy. Soc., A201, 405, 1950.

ASSOCIATION: Moskovskii gosudarstvennyi universitet (Moscow State University)

Institut yadernoi fiziki (Institute of Nuclear Physics)

SUBMITTED: December 21, 1961

Card 2/2

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43162 5/203/62/002/003/014/021 1023/1250

3.9110 AUTIIOR:

TITLE:

Self-excitation of a regular magnetic field when there Tversko, B.A. is a two-dimensional convection in a rotating gravitat-

Geomagnetizm i Aeronomiya, v.2, no.3, 1962, 517-522

TEXT: All present theories of the geomagnetic field assume that it is sustained by convective motions of conducting masses in Earth's nucleus, but no precise mechanism was yet determined. The following

1) Due to the two-dimensional turbulence, the magnetic field becomes orientated along the rotation axis and it proves proportional to the height of the corresponding field tube. mechanism of self-excitation is proposed:

orientated along the rotation axis and it proves proportional to the height of the corresponding field tube.

2) The equatorial belt of three-dimensional turbulence maintains the

flux throughout the sphere. Changes in the flux can be caused only Trux chronghous one sphere. Onunges in one trux can be caused only by fluctuations.

3) The field outside the sphere is close to a dipole field and pene-

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Self-excitation of a regular ...

trates into the sphere in the equatorial belt, where the velocity of flow is low.

4) Fluctuation processes can transfer field tubes into the region of two-dimensional turbulence with a change in polarity, causing thereby an increase of the magnetic flux through the sphere and, consequently, an increase in the dipole moment.

5) The self-excitation continues until the densities of magnetic and kinetic energy are equal.

The magnetic field thus formed in the nucleus has the dipole moment parallel to the rotation axis. After reaching a stationary value the field should remain constant in magnitude and direction. The various anomalies and also the feilure of the magnetic and geographic axes to coincide are due to the relative motion of the nucleus and the shell os the sphere. The change of sign of the geomagnetic field is suggested to occur due to floating of the poles of Earth from one to the other hemisphere, or to the corresponding motion of continents. The period of the reorientation of the Earth's dipole is 100000 years.

Card 2/3

8/203/62/002/003/014/021 1023/1250

Self-excitation of a regular ...

Any foster changes cannot be explaine by the present theory. ing that Venus has a liquid nucleus, a magnetic field should be generated in it. Its dipole moment would be ~ 50% of that of the geomagnetic field, assuming an iron nucleus, and 10 - 25% according to the theory of phase transition. There are 12 references. Most

ASS MINTION:

Moskovskiy gosudarstvennyy ur versitet, Institut yadernoy fiziki (Moscow State University, Institute

SUBMITTED:

December 21, 1961

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Card 3/3

35572 3/056/62/042/003/031/049 B102/B138

26,2331

Tverskoy, B. A.

TITLE:

AUTHOR:

One-dimensional progressive waves, propagating in a plasma

along the magnetic field

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42,

no. 3, 1962, 833-838

TEXT: A one-dimensional stabilized wave is assumed to travel (with velocity U)through a dilute, cold, quasineutral plasma. The problem is to determine the shape of the impulse as dependent on dispersion and dissipation. The problem is solved in two steps: Determination of the pulse shape when neglecting dissipative processes, and determination of dissipative effects on this shape. Without dissipation, the pulse shape will be constant (if far enough from the source) and depend only on the velocity, i. e. the energy & of the pulse. On the assumptions that the plasma should be dilute enough to neglect Coulomb interaction, cold enough to neglect its thermal motion and that the particle velocities are small in relation to c, the calculations are carried out in nonrelativistic singleparticle approximation, neglecting collisions. The plasma is assumed to Card 1/7

S/056/62/042/003/031/049 B102/B138

One-dimensional progressive waves, ...

consist of electrons (velocity  $\vec{v}$ ) and singly charged ions (velocity  $\vec{V}$ ), and the  $\vec{H}_0$ -field  $(\vec{H}_0)$  x) is assumed to be uniform. The basic equations of the problem can be reduced to

$$\Theta d\Theta / ds = \text{Im } PQ^{\bullet},$$

$$dP / ds = (\Theta^{-1} - M^{\bullet}) iP - \mu M^{\bullet} iQ,$$

$$\mu dQ / ds = -(\Theta^{-1} - \mu M^{\bullet}) iQ + M^{\bullet} iP.$$
(19)

with the boundary conditions  $\theta=1$ , P=Q=0 for  $s\to +\infty$   $s=eH_0^{f/mcU}$ ,  $\overrightarrow{v}=\overrightarrow{V}/U$ ,  $\overrightarrow{w}=\overrightarrow{v}/U$ ,  $\theta=1-W_X$ ; the magnetic Mach number  $M=\sqrt{4\pi N_0 m}U/F_0$ , f=x-Ut.  $\mu$  is the electron-to-ion mass ratio. A separation of real and imaginary part yields

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S/056/62/042/003/031/049 B102/B138

One-dimensional progressive waves, ...

 $\Theta d\Theta / ds = -q_1 \rho,$   $d\rho / ds = \mu M^2 q_1,$   $K = \Theta^{-1} - M^2 - \mu M^2 q / \rho,$   $\mu dq / ds = (\Theta^{-1} - \mu M^2) q_1$   $\mu dq_1 / ds + \mu K q = -(\Theta^{-1} - \mu M^2) q + M^2 \rho.$ (A)

with

 $P = \rho \exp\left\{i \int K(s) ds\right\}, \quad Q = (q + iq_1) \exp\left\{i \int K(s) ds\right\}, \quad (20),$ 

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s/056/62/042/003/031/049 B102/B138

One-dimensional progressive waves, ...

and with

$$\Theta = \sqrt{1 - \varphi^{3}},$$

$$q = (\arcsin \varphi - \alpha^{2} \varphi)/\mu \alpha,$$

$$K = \frac{1}{\sqrt{1 - \varphi^{3}}} - \frac{1}{\mu} \frac{\arcsin \varphi}{\varphi}.$$
(B)

$$q_{1}(\varphi) = \pm \frac{1}{\mu \alpha} \left[ 2 \int_{0}^{\varphi} \frac{\arcsin^{2} \varphi}{\varphi} d\varphi - (1 + \mu) \arcsin^{2} \varphi + 2\alpha^{2} (1 + \mu) (1 - \sqrt{1 - \varphi^{2}}) \right]^{1/2}.$$
 (29)

is obtained as an exact solution of (19).  $\alpha = \frac{1}{\mu} M$ ,  $p = \alpha f$ . This result is simplified for waves of medium and small intensity by expanding  $q_1(f)$  into a series and taking the first terms only. The results can be used for  $M \le 10$  with an accuracy of  $\gtrsim 3 \%$ .

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S/056/62/042/003/031/049 B102/B138

One-dimensional progressive waves, ...

$$q_1(\varphi) = \pm \varphi \mu^{-1} \Lambda(M) \sqrt{1 - \varphi^2 / 6\alpha^2 \Lambda^2(M)},$$
 (30)

$$\Lambda(M) = \sqrt{(M^2 - 1)/M^2 + \mu}.$$
 (31)

$$\delta = \frac{\sqrt{\mu mcU_0}}{eH_0} \frac{M}{[M^1(1+\mu)-1]^{V_0}}$$
 (32);

 $q = \frac{16 \Lambda}{\mu} \left| \text{ch} \, \frac{M \Lambda}{V \mu} \, s; \, q_1 = \frac{6}{\mu} \, M \Lambda^2 \, \text{sh} \frac{M \Lambda}{V \mu} \, s \, \left| \text{ch}^2 \, \frac{M \Lambda}{V \mu} \, s; \, K = -\frac{1}{\mu}. \quad \text{quasilinearity} \right|$  can be assumed if  $6 \mu \beta^2 M^6 \, \% 1$ , and non-relativity if  $\beta M M / \gamma \mu$ . The pulse width is given by

$$\varphi = V \tilde{6} \alpha \Lambda / ch \frac{M \Lambda s}{V \mu}. \tag{40}$$

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V

S/056/62/042/003/031/049 B102/B138

One-dimensional progressive waves, ...

The equations obtained for the field lines and particle trajectories show that they form spirals with a pitch of Mµ $_{0}$ , which increases with the wave intensity. This chirality is caused by the nonlinear effects. The particle density maximum coincides with the pulse maximum. The relation between Mach number and wave energy is obtained as  $\frac{1}{2} = 6 \Lambda M_{0}^{2} \sqrt{|\mu|}, \quad \frac{1}{2} = \frac{1}{2} mcU_{0} / 8 \pi e H_{0}$  is the magnetic energy of the non-perturbed field per cm<sup>2</sup> and unit length  $\frac{1}{2}$ .

$$M^{3} = 1 + \sqrt{1 + \frac{\mu}{36} \left(\frac{6}{60}\right)^{3}/2(1 + \mu)}.$$
 (44).

Even small oscillations of the magnetic field cause a considerable acceleration of the electron component at the pulse maximum;  $v_0 = \frac{1671 \text{MU}_0}{\mu} \text{ is the maximum electron velocity.} \quad \text{For the ions, } v_0 = \frac{16071 \text{MU}_0}{\mu} \text{ is the wave energy appears as kinetic electron energy.} \quad \text{There are 4 Soviet references.}$ 

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S/056/62/042/003/031/049 B102/B138

One-dimensional progressive waves, ...

Institut yadernoy fiziki Mcskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State ASSOCIATION:

University)

September 25, 1961 SUBMITTED:

Card 7/7

s/02c/62/143/002/cc6/c22 B164/B102

16.2000 24.2500

Tverskoy, B. A.

TITLE:

Stability of the flow of a well conducting liquid across a

magnetic field

Akademiya nauk SSSR. Doklady, v. 143, no. 2, 1962, 301-304 PERIUDICAL:

TEXT: Proceeding from the linearized magnetohydrodynamic equations

(4)-(5),  $\frac{\partial h}{\partial t} + v_z \frac{d\vec{\mathcal{H}}}{dz} = (\vec{\mathcal{H}} \nabla) V,$   $\frac{\partial}{\partial t} \operatorname{rot} V = \frac{1}{4\pi\rho} \operatorname{rot} \left\{ (\vec{\mathcal{H}} \nabla) h + h_z \frac{d\vec{\mathcal{H}}}{dz} \right\}$ 

where  $\mathcal{H}_{x} = H_{0}\lambda z$ ,  $\mathcal{H}_{y} = 0$ ,  $\mathcal{H}_{z} = H_{0}$ , and  $\lambda = \frac{4\pi}{H^{2}} \frac{dP}{dx}$ , disturbances of the

flow rate  $\vec{v}$  and the field  $\vec{h}$  are investigated, which lie in the xz-plane and are independent of y. By eliminating  $v_{_{X}}$  one obtains

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S/020/62/143/502/608/622 B104/B102

Stability of the flow of ...

$$\frac{d}{dz} \left\{ \omega^2 + \frac{H_0^2}{4\pi\rho} \left( 2ik\lambda z + \frac{d}{z} \right)^2 \right\} \frac{dv}{dz} = k^2 \left\{ \omega^2 + \frac{H_0^2}{4\pi\rho} \left( 2ik\lambda z + \frac{d}{dz} \right)^2 \right\} v. \quad (10) ,$$

 $v_z \equiv v$ , which acquires the form

the form
$$\frac{d}{ds} \left\{ \Lambda^2 + \left( 2i\kappa s + \frac{d}{ds} \right)^2 \right\} \frac{dv}{ds} = (kl)^2 \left\{ \Lambda^2 + \left( 2i\kappa s + \frac{d}{ds} \right)^2 \right\} v. \tag{10}$$

by introducing the dimensionless coordinate s=z/1 and the parameters

$$\varkappa = l^2 k \lambda = \frac{4\pi}{H_0^2} \frac{dP}{dx} k l^2, \quad \Lambda = \frac{l\omega \sqrt{4\pi\rho}}{H_0}.$$

The analysis of this equation is restricted to cases which are of interest for cosmic electrodynamics. The equation

$$\frac{d}{ds} \left\{ \Lambda^2 + e^{-i\kappa s^2} \frac{d^2}{2} e^{i\kappa s^2} \right\} \frac{dv}{dx} = 0. \tag{12}$$

is obtained by neglecting the right-hand side of (10') and allowing for the identity of operators

$$\left(2i\kappa s + \frac{d}{ds}\right)f = e^{-i\kappa s^2} \frac{d}{ds} e^{i\kappa s^2}f, \qquad (11).$$

Card 2/4

Stability of the flow of ...

s/020/62/143/002/006/022 B104/B102

In addition to the solution  $v=\mathrm{const}$ , this equation also has two even and two odd solutions. All the even solutions are stable. The odd solutions can be represented by

$$\frac{\lg \Lambda}{\Lambda} = \frac{1}{\varkappa \Lambda} \frac{\int\limits_{0}^{1} (\sin \varkappa \cos \varkappa x^{2} - \cos \varkappa \sin \varkappa x^{2}) \frac{\sin \Lambda \cos \Lambda x - x \cos \Lambda \sin \Lambda x}{1 - x^{2}} dx}{\left(\int\limits_{0}^{1} \cos \varkappa x^{2} \cos \Lambda x dx\right)^{2} + \left(\int\limits_{0}^{1} \sin \varkappa x^{2} \cos \Lambda x dx\right)^{2}}.$$
 (14).

As the right-hand side of this function is limited, its graphical representation cuts all the branches of the tan Λ/Λ, except those between -π/2 and π/2. Accordingly, there is an infinite number of stable solutions. The unstable solutions, which are related to the branches mentioned above, are analyzed for the case of long waves (n≥1). There are 6 references: 2 Soviet and 4 non-Soviet. The three references to Englishlanguage publications read as follows: R. C. Lock, Proc. Roy. Soc., 233Å, 189 (1954); G. K. Batchelor, Proc. Roy. Soc., Ser. Å., 201, 405 (1950); H. Alfvén, Phys. Rev., 75, 1732 (1949).

Stability of the flow of ...

\$/020/62/143/GG2/CG8/G22 B104/B102

ASSOCIATION:

Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED:

July 4, 1961, by M. A. Leontovich, Academician

SUBMITTED:

June 30, 1961

Card 4/4

3,2600

S/020/62/144/002/017/028 B104/B102

AUTHOR:

Tverskoy, B. A.

TITLE:

Effect of a magnetic field on the increase of the amplitude of acoustic waves in a medium of decreasing density

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 2, 1962, 338-340

TEXT: The following magneto-hydrodynamic equation for oscillation of the atmosphere is se'up:  $(\kappa^2+e^{-\xi})\,\frac{d^2v}{d\xi^2}-e^{-\xi}\,\frac{dv}{d\xi}+e^{-\xi}\lambda^2v=0,$ 

$$x^2 = \frac{H_0^2}{4\pi\gamma\rho_0}, \quad \xi = \frac{z}{z_0}, \quad \lambda^2 = \frac{\omega^2z_0}{\gamma\rho}.$$

If  $\chi^2$  = 0, the solution of this equation corresponds to cumulative acceleration. For  $\chi$  0, and using the substitution  $x = 1 + \exp(-\xi)/\kappa^2$ , the equation of oscillation is transformed into a hypergeometric.

equation. The solution for x>1 reads:  $v_1 = (1/x)^{\alpha} F(\alpha,\alpha,2\alpha,1/x)$ ; Card 1/3

S/020/62/144/002/017/028 B104/B102

Effect of a magnetic field on the ...

 $V_2 = v_1^*$  (where F is a hypergeometric function). At  $x \to 1$ , the two solutions diverge logarithmically. The following linear combinations remain finite at  $x \to 1$ :

$$v_{\mathbf{3}} = \operatorname{Im}\left\{0 \left(\frac{1}{x}\right)^{\alpha} F\left(\alpha, \alpha, 2\alpha, \frac{1}{x}\right)\right\}$$

and

$$v_4 = \operatorname{Re}\left\{0^*\left(\frac{1}{x}\right)^{\alpha} F\left(\alpha, \alpha, 2\alpha, \frac{1}{x}\right)\right\}.$$

At larger intervals, the solutions pass over into electromagnetic waves. If  $k \ll 1$  and  $x \ll 1$ , the relation for the wave velocity reads:

$$v \approx v_0 e^{2/2} \frac{\sin{(s\xi + 2s \ln{\kappa} - \phi)}}{\sin{(2s \ln{\kappa} - \phi)}} ,$$

Card 2/3

Effect of a magnetic field on the ... s/020/62/144/002/017/028 B104/B102

This is a solution of the acoustic type with growing velocity. Academician M. A. Leontovich is thanked for his advice.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V.

(Moscow State University imeni M. V. Lomonosov)

PRESENTED:

December 23, 1961, by M. A. Leontovich, Academician

SUBMITTED:

December 14, 1961

Card 3/3

S/203/63/003/001/005/022 A061/A126

24,2120

AUTHORS:

Sigov, Yu. S., Tverskoy, B. A.

TITLE:

On the structure of the boundary layer between a magnetic

field and a plasma stream

PERIODICAL: Geomagnetizm i aeronomiya, v. 3, no. 1, 1963, 43 - 49

TEXT: The boundary layer between a plasma stream and a magnetic field was investigated by taking account of the thermal spread of the ion velocities. By starting from the linear equations of electron motion in a magnetic field it is shown that the electric field can be neglected when examining an equilibrium boundary between corpuscular stream and magnetic field. The plane boundary layer between a magnetic field being uniform in + on and a plasma stream coming from - on is investigated. The problem, which is mathematically equivalent to the problem of equilibrium of a plasma stream being normal to a magnetic field and consisting of positive and negative ions of equal mass, is solved by the method of velocity groups. Taking the thermal spread of ion velocities into account

Card 1/2

On the structure of the boundary layer ... \( \text{3/203/63/003/001/005/022} \)

leads to a thin structure of the boundary layer.\( \text{1} \)

boundary layer of elevated particle density can be the cause of autonomous tites are apt to produce interesting effects, e.g. the trapping of particles by the geomagnetic field. There are 5 figures.\( \text{1} \)

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova AN SSSR (Institute of Mathematics imeni V. A. Steklova SUSSR) fiziki (Moscow State Universitet, Institut yadernoy Physics)

SUBMITTED: October 16, 1962

SIGOV, Yu.S.; TVERSKOY, B.A.

Structure of the boundary layer between the magnetic field and the plasma stream. Geomag. i aer. 3 no.1:43-49 Ja-F 163. (MIRA 16:4)

1. Matematicheskiy institut imeni V.A.Steklova AN SSSR i Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.

(Magnetic storms)

Navisco readilization di institutioni della compania della compania della compania della compania della compani

TVERSKOY, B. A.;

"On the nature of the Earth's radiation belts". (USSE)"

Report submitted for the COSPAR Fifth International Space Science Symposium, Plorence, Italy, 8-20 May 1964.

TVERSKOY, B.A.

Structure of shock waves in a plasma. Zhur. eksp. i teor. fiz. 46 no.5:1653-1663 My '64. (MRA 17:6)

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1. Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.

APPROVED FOR RELEASE: 04/03/2001 CIA-RDP86-00513R001757630003-9"

ACCESSION NR: AP4040706

8/0203/64/004/003/0436/0457

AUTHOR: Tverskoy, B. A.

TITLE: Dynamics of the radiation belts of the earth.

SOURCE: Geomagnetizm'i aeronomiya, v. 4, no. 3, 1964, 436-457

TOPIC TAGS: terrestrial radiation belt, geomagnetic field, magnetosphere, ring current, corpuscular stream, magnetic storm, ionosphere, potential magnetic force line, neutron decay

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ABSTRACT: The terrestrial radiation belts are unstable, and their variations are associated with disturbances of the geomagnetic field owing to displacements of the boundary of the magnetosphere or to the appearance of ring currents. Strong increases in the pressure of corpuscular streams on the magnetosphere generate magnetic storms with sudden commencement. These magnetic disturbances consist of three components: the current field at the boundary of the magnetosphere, the current field appearing in the lower part of the ionosphere and at the earth's surface, and the drift current field in the magnetosphere. The first two components are of potential nature and

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### ACCESSION NR: AP4040706

the third component is located in shells of the magnetosphere. The lines of force of the magnetic field of the magnetosphere move together with the charged particles. The particles on the daylight side approach the earth and those on the night side leave the earth. In 1959-1961 the outer belt was in a stable state, but in 1962 its structure was changed due to a sharp decrease in the frequency of magnetic storms and capture of neutron decomposition products. A theoretical attempt was made to explain the appearance of radiation belts by motion of charged particles in an electromagnetic field and by the activity of magnetic storms. Orig. art. has: 5 figures, 77 formulas, and 1 table.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet, Institut -xadernoy fiziki (Moscow State University, Institute of Nuclear Physics)

SUBMITTED: 28Nov63

ATD PRESS: 3042

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APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R001757630003-9"

s/0203/64/004/002/0224/0232

ACCESSION NR: AP4031625

AUTHOR: Tverskoy, B. A.

CITLE: Dynamics of radiation belts of the earth. 1. Sources of high speed particles

SOURCE: Geomagnetizm i aeronomiya, v. 4, no. 2, 1964, 224-232

TOPIC TAGS: radiation belt, high speed particle, magnetic storm, drift orbit, magnetosphere, ionospheric acceleration

ABSTRACT: The author has undertaken this study because of the inadequacy of the process of neutron decay (or any other process previously proposed) to explain the outer radiation belt. Even as a cause of the inner belt, neutron decay can be considered only secondary: responsible for injection of particles but not of the intensity distribution in space. During magnetic storms, high-speed particles from interplanetary space (electrons, protons, and helium nuclei) are captured in closed drift orbits at some distance from the earth. In drift shells at a distance of 6-7 earth radii from the earth's center, the intensity of these particles is

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# ACCESSION NR: AP4031625

maintained at an average value that differs from zero. Neutron decay is a second source of high-speed particles. Diffusion of particles across the drift shells leads ultimately to removal of these particles from the magnetosphere. Ionospheric acceleration, however, even when increase in reflection points by diffusion is considered, cannot explain the outer radiation belt near the equatorial plane. Neither experimental data nor theoretical computations indicate at the present time any sources of particles with energies greatly exceeding 100 key, apart from those pointed out here. Orig. art. has: 1 figure and 9 formulas.

ASSOCIATION: Moskovskiy gosudarstvenny\*y universitet (Moscow State University); Institut yadernoy fiziki (Institute of Nuclear Physics)

SUBMITTED: 28Nov63

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OTHER: OLO

Card 2/2

### "APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R001757630003-9

ENT(1)/FCC/EWA(h) ACC NR: AP6012055

SOURCE CODE: UR/0203/65/005/005/0793/0808

AUTHOR: Tverskoy, B. A.

ORG: none

TITIE: Transfer and acceleration of charged particles in the Earth's magnetosphere

SOURCE: Geomagnetizm i aeronomiya, v. 5, no. 5, 1965, 793-808

TOPIC TAGS: geomagnetic disturbance, geomagnetic field, electric field, asymptotic solution, proton, radiation belt, electron

ABSTRACT: This is a review, based on 33 cited sources. With accumulation of experimental data and development of the theory of the radiation belts the role of transfer of trapped particles across the drift sholls of the geomagnetic field became increasingly clear. The transfer is caused by the drift of particles in nonstationary electrical fields arising during geomagnetic disturbances. The full nature of this pheno monon is described as developed over a period of years. A detailed investigation of stationary and nonstationary transfer processes with Coulomb losses taken into account resulted in an asymptotic solution for protons of the inner belt and the position of the maximum of the outer proton belt was estimated as a function of particle energy. Results published in 1964 led to an appreciable reevaluation of transfer processes. These made it possible to compute the principal constant Do of transfer theory directly on the basis of magnetic data. The latest data indicate that the characte-

Card 1/2

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APPROVED FOR RELEASE: 04/03/2001 CIA-RDP86-00513R001757630003-9"

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ACC NR: AP6012055

ristic times of transfer in actuality are two orders of magnitude less than assumed earlier. This conclusion agrees well with the results of determination of the lifetime of electrons on the basis of an analysis of the dynamics of the aritficial radiation belts. Orig. art. has: 5 figures and 36 formulas. DPRS/

SUB CODE: 08, 20, 04 / SUEM DATE: none / ORIG REF: 013 / OTH REF: 021

L 20511-66 ENT(1)/ENP(m)/ENA(d)/ETC(m)-6/ENA(1) WW
ACC NR: AP6006653 SOURCE CODE: UR/0203/66/006/001/0011/0018

AUTHOR: Tverskoy, B. A.

ORG: Moscow State University, Institute of Nuclear Physics (Moskovskiy gosudarstvennyy universitet, Institut yadernoy fiziki)

TITLE: On the theory of hydrodynamic self-excited regular regnetic fields

SOURCE: Geomagnetizm i aeronomiya, v. 6, no. 1, 1966, 11-18

TOPIC TAGS: magnetic field, hydrodynamics, hydromagnetics, vortex, Reynolds number

ABSTRACT: A theoretical study is made of the hydromagnetic phenomena in toroidal vortices. First, the field amplification in a toroidal vortex is analyzed without dissipative effects. This is done for a large magnetic Reynolds number, using the magnetic induction equation which, for the simplest case, leads to the expression

 $H_{x_{m0}}(t) = \frac{arH_{0r}(r)}{a + r\cos x} \frac{d\Omega(r)}{dr} te^{im\phi}.$ 

Next, to illustrate the field amplification phenomena, the example of a liquid sphere is considered in a pulsating vortex leading to the expression

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